

**WHAT IS CLAIMED IS:**

1. A mobile communication system composed of a home agent, a mobile node, and one or more correspondent nodes,

wherein said mobile node comprises:

5 means for storing a preassigned representative home address, 0 or more preassigned subsidiary home addresses, and a care-of address temporarily assigned in a network in which the mobile node is currently present; and

means for making a registration request for joint information which relates the representative home address to all subsidiary home addresses and the  
10 care-of address to said home agent, each time the mobile node moves to other network, and is assigned a new care-of address, and

wherein said home agent comprises:

means for receiving the registration request for said joint information, and if a packet destined for the representative address or any secondary address arrives  
15 from any correspondent node, retrieving the joint information including the representative home address or the subsidiary home address, from a table in which the joint information is registered, and transferring the packet to the care-of address corresponding to the address for which the packet is destined.

2. The mobile communication system according to claim 1,

20 wherein said mobile node comprises:

means for registering a part of the subsidiary home addresses owned by said mobile node at the time of processing of the registration of said joint information, and managing the remaining as unregistered subsidiary home addresses;

25 means for requesting additional registration of the unregistered subsidiary

home addresses to the home agent at a given point in time; and

means for requesting deregistration of the registered subsidiary home addresses to the home agent, and

wherein, if additional registration of a subsidiary home address is  
5 requested from the mobile node, said home agent comprises:

means for adding the address to the corresponding joint information of the mobile node; and

if the deregistration of the subsidiary home address is requested, means for erasing the address from the corresponding joint information of the mobile node,

10 whereby the number of the subsidiary home addresses which will be used, out of the subsidiary home addresses owned by said mobile node may be dynamically changed.

3. The mobile communication system according to claim 1 or claim 2,

wherein said mobile node comprises:

15 means for requesting an assignment of a new subsidiary home address to the home agent; and

means for returning the assigned subsidiary home address, and

wherein, if the assignment of the new subsidiary home address is requested from the mobile node, said home agent comprises:

20 means for selecting arbitrary address from an unassigned address group owned by the home agent to register this address with the joint information of the mobile node, and notifying the mobile node of it; and

if the assigned subsidiary home address is returned from the mobile node,

25 means for returning this to the unassigned addresses, and erasing this from the joint information of the mobile node,

whereby the number of the subsidiary home addresses owned by the mobile node may be dynamically changed.

4. The mobile communication system according to any one of claim 1 to claim 3, a plurality of mobile network nodes being located under said mobile node,

5 these constituting a local network with said mobile node as a router,

wherein said mobile node comprises:

means for assigning the subsidiary home addresses to the mobile network nodes, and if a packet destined for the subsidiary home address assigned to the mobile network nodes arrives, transferring this to the corresponding mobile  
10 network node,

whereby said mobile node performs location registration for the mobile network nodes in the local network managed by said mobile node by proxy, and transfers the packet destined for the mobile network node.

5. The mobile communication system according to claim 4,

15 wherein, if a new mobile network node is added within the local network, and the mobile network node requests an assignment of an address to the mobile node, said mobile node comprises:

means for assigning any unregistered subsidiary home address to the mobile network node, and requesting additional registration of this subsidiary  
20 home address to the home agent; and  
if the mobile network node is deleted from within the local network, and the mobile network node notifies the mobile node of returning the subsidiary home address,

means for requesting deregistration of this subsidiary home address,

25 whereby the number of registration of the subsidiary home addresses

owned by the mobile node is dynamically increased or decreased according to the added or deleted mobile network nodes.

6. The mobile communication system according to claim 4,

5 wherein, if a new mobile network node is added within the local network managed by the mobile node, and the mobile network node requests an assignment of an address to the mobile node, said mobile node comprises:

means for acquiring a new subsidiary home address from the home agent, and assigning this to the mobile network node; and

10 if the mobile network node is deleted from within the local network managed by the mobile node, and the mobile network node notifies the mobile node of returning the subsidiary home address, the mobile node comprises:

means for returning the subsidiary home address to the home agent,

15 whereby the number of the subsidiary home addresses owned by the mobile node is dynamically increased or decreased according to the added or deleted mobile network nodes.

7. The mobile communication system according to any one of claim 1 to claim 6,

20 wherein, if the representative home address and any number of the subsidiary home addresses are simultaneously registered, updated, or deleted with respect to the home agent, said mobile node comprises means for transmitting information on all addresses in one message to the home agent.

8. A mobile node in a mobile communication system composed of a home agent, the mobile node, and one or more correspondent nodes, the mobile node comprising:

25 means for storing a preassigned representative home address, 0 or more preassigned subsidiary home addresses, and a care-of address temporarily assigned

in a network in which the mobile node is currently present; and

means for making a registration request for joint information which relates the representative home address to all subsidiary home addresses and the care-of address to said home agent, each time the mobile node moves to other  
5 network, and is assigned a new care-of address.

9. The mobile node according to claim 8, further comprising:

means for registering a part of the subsidiary home addresses owned by the mobile node at the time of processing of the registration of said joint information, and managing the remaining as unregistered subsidiary home  
10 addresses;

means for requesting additional registration of the unregistered subsidiary home addresses to the home agent at a given point in time; and

means for requesting deregistration of the registered subsidiary home addresses to the home agent.

15 10. The mobile node according to claim 8 or claim 9, further comprising:

means for requesting an assignment of a new subsidiary home address to the home agent; and

means for returning the assigned subsidiary home address.

11. The mobile node according to any one of claim 8 to claim 10, comprising:

20 means for assigning any subsidiary home address to a plurality of the mobile network nodes under the mobile node, and if a packet destined for the subsidiary home address assigned to the mobile network nodes arrives, transferring this to the corresponding mobile network node,

whereby the mobile node performs location registration for the mobile  
25 network nodes in the local network managed by the mobile node by proxy, and

transfers the packet destined for the mobile network node.

12. The mobile node according to claim 11, comprising:

if a new mobile network node is added within the local network, and the mobile network node requests an assignment of an address,

5           means for assigning any unregistered subsidiary home address to the mobile network node, and requesting additional registration of this subsidiary home address to the home agent; and

if the mobile network node is deleted from within the local network, and the mobile network node notifies returning the subsidiary home address,

10           means for requesting deregistration of this subsidiary home address,

          whereby the number of registration of the subsidiary home addresses owned by the mobile node is dynamically increased or decreased according to the added or deleted mobile network nodes.

13. The mobile node according to claim 11, comprising:

15   if a new mobile network node is added within the local network managed by the mobile node, and the mobile network node requests an assignment of an address,

          means for acquiring a new subsidiary home address from the home agent, and assigning this to the mobile network node; and

if the mobile network node is deleted from within the local network managed by

20   the mobile node, and the mobile network node notifies returning the subsidiary home address,

          means for returning the subsidiary home address to the home agent,

          whereby the number of the subsidiary home addresses owned by the mobile node is dynamically increased or decreased according to the added or  
25   deleted mobile network nodes.

14. The mobile node according to any one of claim 8 to claim 13, comprising:  
if the representative home address and any number of the subsidiary home  
addresses are simultaneously registered, updated, or deleted with respect to the  
home agent,

5           means for transmitting information on all addresses in one message to the  
home agent.

15. A home agent in a mobile communication system composed of the home  
agent, a mobile node, and one or more correspondent nodes, the home agent  
comprising:

10           means for receiving a registration request for joint information which  
relates the representative home address of the mobile node, a plurality of subsidiary  
home addresses owned by the mobile node, and a care-of address temporarily  
assigned to the mobile node in a network in which the mobile node is currently  
present, from the mobile node; and

15   if a packet destined for the representative home address or any subsidiary home  
address arrives from a table in which the joint information is registered, and any  
correspondent node,

          means for retrieving the joint information including the representative  
home address or the subsidiary home address from said table, and transferring the  
20   packet to the care-of address corresponding to the address.

16. The home agent according to claim 15, further comprising:  
if additional registration of a subsidiary home address is requested from the mobile  
node,

          means for adding the address to the corresponding joint information of the  
25   mobile node; and

if deregistration of the subsidiary home address is requested,

means for erasing the address from the corresponding joint information of the mobile node.

17. The home agent according to claim 15 or claim 16, further comprising:

5 if an assignment of a new subsidiary home address is requested from the mobile node,

means for selecting arbitrary address from an unassigned address group owned by the home agent to register this address with the joint information of the mobile node, and notifying the mobile node of it; and

10 if the assigned subsidiary home address is returned from the mobile node,

means for returning this to the unassigned addresses, and erasing this from the joint information of the mobile node.

18. A control program for a mobile node in a mobile communication system composed of a home agent, the mobile node, and one or more correspondent nodes,

15 wherein said control program allows said mobile node to function as means for storing a preassigned representative home address, 0 or more preassigned subsidiary home addresses, and a care-of address temporarily assigned in a network in which the mobile node is currently present; and

as means for making a registration request for joint information which  
20 relates the representative home address to all subsidiary home addresses and the care-of address to the home agent, each time the mobile node moves to other network, and is assigned a new care-of address.

19. The control program for the mobile node according to claim 18,

wherein said control program further allows said mobile node to function  
25 as means for registering a part of the subsidiary home addresses owned by said



mobile node at the time of processing of the registration of said joint information, and managing the remaining as unregistered subsidiary home addresses;

as means for requesting additional registration of the unregistered subsidiary home addresses to the home agent at a given point in time; and

5 as means for requesting deregistration of the registered subsidiary home addresses to the home agent.

20. The control program for the mobile node according to claim 18 or claim 19,

wherein said control program further allows said mobile node to function as means for requesting an assignment of a new subsidiary home address to the

10 home agent; and

as means for returning the assigned home address to the home agent.

21. The control program for the mobile node according to any one of claim 18 to claim 20,

15 wherein said control program allows said mobile node to function as means for assigning any subsidiary home address to a plurality of mobile network nodes under said mobile node, and if a packet destined for the subsidiary home address assigned to the mobile network nodes arrives, transferring this to the corresponding mobile network node.

22. The control program for the mobile node according to claim 21,

20 wherein if a new mobile network node is added within a local network, and the mobile network node requests an assignment of an address, said control program allows said mobile node to function as means for assigning any unregistered subsidiary home address to the mobile network node, and requesting additional registration of this subsidiary home address to the home agent, and if the  
25 mobile network node is deleted from within the local network, and the mobile

network node notifies returning the subsidiary home address, as means for requesting deregistration of this subsidiary home address to the home agent.

23. The control program for the mobile node according to claim 21,

5 wherein, if a new mobile network node is added within a local network managed by the mobile node, and the mobile network node requests an assignment of an address, said control program allows said mobile node to function as means for acquiring a new subsidiary home address from the home agent, and assigning this to the mobile network node; and

10 if the mobile network node is deleted from within the local network managed by said mobile node, and the mobile network node notifies returning the subsidiary home address,

as means for returning the subsidiary home address to the home agent.

24. The control program for the mobile node according to any one of claim 18 to claim 23,

15 wherein, if the representative home address and any number of the subsidiary home addresses are simultaneously registered, updated, or deleted with respect to the home agent, said control program allows said mobile node to function as means for transmitting information on all addresses in one message to the home agent.

20 25. A control program for a home agent in a mobile communication system composed of the home agent, a mobile node, and one or more correspondent nodes,

25 wherein said control program allows said home agent to function as means for receiving a registration request for joint information which relates the representative home address of the mobile node, a plurality of subsidiary home addresses owned by the mobile node, a care-of address temporarily assigned to the

mobile node in a network in which the mobile node is currently present, from the mobile node, and storing the joint information; and

if a packet destined for the representative home address or any subsidiary home address arrives from any correspondent node,

5           as means for retrieving the joint information including the representative home address or the subsidiary home address from the stored joint information, and transferring the packet to the care-of address corresponding to the address.

26. The control program for the home agent according to claim 25,

          wherein, if additional registration of a subsidiary home address is  
10 requested from the mobile node, said control program allows said home agent to function as means for adding the address to the corresponding joint information of the mobile node; and

if deregistration of the subsidiary home address is requested,

          as means for erasing the address from the corresponding joint information  
15 of the mobile node.

27. The control program for the home agent according to claim 25 or claim 26,

          wherein, if an assignment of a new subsidiary home address is requested from the mobile node, said control program allows said home agent to function as means for selecting arbitrary address from an unassigned address group owned by  
20 the home agent to register this address with the joint information of the mobile node, and notifying the mobile node of it; and

if the assigned subsidiary home address is returned from the mobile node,

          as means for returning this to the unassigned addresses, and erasing this from the joint information of the mobile node.

25 28. An address management method in a mobile communication system

composed of a home agent, a mobile node, and one or more correspondent nodes,

wherein the mobile node comprises the steps of:

when a new care-of address is assigned by that a temporarily assigned care-of address moves to other network,

5           making a registration request for joint information which is joint information which relates this new assigned care-of address, a preassigned representative home address, and 0 or more preassigned subsidiary home addresses to the home agent, and

wherein the home agent comprises the steps of:

10           receiving the registration request for said joint information from the mobile node, and storing the joint information; and

if a packet destined for the representative home address or any subsidiary home address arrives from any correspondent node,           retrieving the joint information including the representative home address or the subsidiary home address from the  
15           stored joint information, finding the care-of address corresponding to the address on the basis of the joint information, and transferring said packet to the care-of address.

29. The address management method in the mobile communication system according to claim 27,

20           wherein the mobile node does not register a part of the subsidiary home addresses owned by the mobile node with the home agent during processing of the registration of the joint information, requests additional registration of the unregistered subsidiary home addresses to the home agent at a point in time when the unregistered subsidiary home addresses become necessary, and requests  
25           deregistration of the registered subsidiary home addresses to the home agent, if the

registered subsidiary home addresses become unnecessary, and

wherein said home agent makes additional registration or deregistration of the subsidiary home addresses in the corresponding joint information of the mobile node based on the registration request of the home agent,

5           whereby the number of the subsidiary home addresses which will be used, out of the subsidiary home addresses owned by the mobile node may be dynamically changed.

30. The address management method in the mobile communication system according to claim 27 or claim 28,

10           wherein the home agent has the unassigned addresses, and if an assignment of a new subsidiary home address is requested from the mobile node, selects arbitrary address from the unassigned addresses owned by the home agent to register this address with the joint information of said mobile node, and notifies the mobile node of it, thereby allowing the mobile node to acquire the new subsidiary  
15   home address, and

wherein, if the subsidiary home address becomes unnecessary, the mobile node returns this subsidiary home address to the home agent, and the home agent erases its subsidiary home address from the joint information,

20           whereby the number of the subsidiary home addresses owned by the mobile node may be dynamically changed.